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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,951	02/08/2005	Karin Scherer	ESSR:090US/10501360	8552

32425 7590 01/11/2008
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EXAMINER	
LANGMAN, JONATHAN C.	
ART UNIT	**PAPER NUMBER**
1794	

MAIL DATE	DELIVERY MODE
01/11/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/523,951	SCHERER ET AL.	
	Examiner	Art Unit	
	Jonathan C. Langman	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-67* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/02/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 22-67 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The applicant amended independent claim 22 and 47 with the limitation the metal oxide layer is deposited through ion beam assisted vapor phase deposition comprising bombarding the layer with a beam of positive ions, "wherein the beam of positive ions is formed with an ion gun". For support for this new limitation the applicant points to page 4, line 17 of the instant specification. However, this support first directed to art in the field of the invention, and not the invention itself, and furthermore, is directed to the deposition of SiOF layers not metal oxide layers of SiO_2.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 40 and 61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention. It is unclear as to which "HI layer" the claims are referring to, there are several antecedent basis. The Examiner believes that the applicant is referring to the "HI layer closest to the SiO_xF_y layer" and this is how the claim will be interpreted in this action. However, further clarification is needed to make the claim definite.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 22-30, 33 and 47-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (EP 0975017 A2) in view of Machol (US 5,719,705).

Regarding claims 22 and 47, EP teaches semiconductor devices on a wafer substrate comprising a fluorine doped silicon layer (FSG) on which is disposed a dielectric silicon dioxide layer cap layer and a SiON layer (Lee, [0030]). EP go on to teach that the silica dielectric capping layer is deposited by PECVD and CVD [0002]. The PECVD of EP utilizes ion bombardment (by definition) however is silent to the use of depositing with an ion gun. Machol et al. teaches well known deposition techniques of silicon oxide layers in the art. The methods of Machol et al. teach that silicon dioxide layers can be deposited by many techniques known in the art. These techniques include CVD, IBAD, and sputtering, the sputtering technique may use a sputtered metal

layer on a substrate and thereafter expose the metal layer to a reactive gas (e.g. oxygen), to form a metal oxide, other techniques include PECVD, and ion bombardment assisted deposition col. 6, line 50 – col. 7, lines 40). It would have been obvious to utilize any known deposition technique in the art to deposit the metal oxide layer of EP. Machol is relied upon for the known techniques of deposition in the art, it would have been obvious to a routineer in the art to utilize any known technique of deposition of metal oxides, including those instantly listed in claims 22 and 47. The layer of silicon oxide on the SiOF layer is said to protect the underlying layer to some degree.

Regarding claims 23-25, 48-50, EP teach that the silica cap layer can be up to 2000 nm [0060]. Thus overlapping the instantly claimed ranges.

Regarding claim 26, Machol et al. teach that oxygen is used as a gas to form the layers of SiO_2 (col. 7, lines 5-10).

Regarding claims 27 Machol et al. teach the deposition of the SiO_2 layer by commonly known practices of IBAD which utilizes argon gas as the ionizing gas for the ion gun (col. 8, lines 50-55).

Regarding claims 28, 29, 51 and 52, EP teach that the FSG layer is 100-1000 nm thick [0060]. Thus overlapping the instantly claimed ranges.

Regarding claims 30 and 53, although EP is silent to the refractive index of the layer, it is inherent, that the refractive index of the material at the given wavelength and time will be the same, since the materials and thicknesses of EP and the instant application are similar.

Regarding claims 33 and 54, the stack as described above is formed on a semiconductor substrate and has antireflective properties (abstract).

Claims 30, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (EP 0975017 A2), referred to as [EP] in view of Machol (US 5,719,705), as applied above, in view of Lee et al. ("Inhomogeneous refractive index of SiOxFy thin films prepared by ion beam assisted deposition", referred to as [INH].

As described above [EP], teach a SiOxFy film with a protective silicon oxide film disposed thereon. EP teaches that the SiOxFy film is made by PECVD, and does not teach producing the layer through cathodic sputtering with simultaneous gas treatments of oxidation and a fluorinated gas. However, INH teach a method for producing a SiOxFy film, comprising IBAD of a silicon film , and simultaneously oxidizing the target and introducing a CF_4 gas into the chamber to turn the layer into a SiO_xF_y film. It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use the process of INH to form the SiO_xF_y film that is used by EP; because INH has shown that the process is a known method in the art for forming the material. INH go on to teach that the refractive index of the SiO_xF_y layers is 1.41 and 1.44, which overlaps the applicants claimed range of 1.38 to 1.44.

Claims 22-30, 33-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Machol et al. (U.S. 5,719,705), and INH, in view of EP.

Regarding claims 22-25, 28, 29, 33-39, 47-52, and 54-60, Machol et al. teach an antireflective coating on a transparent substrate such as an ophthalmic lens. The antireflective coating comprises alternating layers of high and low refractive index materials. Machol teaches that the H.I. layer is the layer closest to the substrate. And also teaches that any number of layers can be used for the Anti reflective coating however, 3-12 layers is preferred (Machol et al., col. 3, lines 40-50). In a specific example shown in Table 1, Machol et al. teach an ARC that comprises 4 layers. A Hi/Li/Hi/Li, with respective thicknesses of 11.33nm/ 27.30nm/ 111.07nm/ 80.91nm. These ranges overlap the instantly claimed ranges. Machol et al. fail to teach that the last Li layer comprises a stabilized SiO_xF_y layer, with a silica protective layer thereon. However, INH teach a SiO_xF_y layer as described above, and goes on to teach that It would have been advantageous to use this layer in an antireflective coating because the low index silicon oxyfluoride thin films can reduce the number of high and low index multilayers and widen the bandwidth of multilayer high reflectors. Therefore it would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use the SiO_xF_y layer as taught by INH in the antireflective coating of Machol et al. because INH teaches the many benefits encountered by the alternative use of the low refractive index material. Furthermore, a reduction in the number of high low index multilayers will result in a lower cost of production. Thus the refractive index would take on a thickness of the outer Li as taught by Machol et al. to be 80.91 nm. The combination of INH and Machol fail to teach a protective layer of SiO_2 on top of the SiO_xF_y layer, however, EP teaches the use of a SiON and a SiO_2 layer up to 2000 nm

as described above, to help with the out diffusion of fluorine from the SiO_xF_y layer, since the layer of SiO_2 layer is directly on top of the SiOF layer it is said to be protective. It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use a silica and SiON layer on top of the SiO_xF_y layer in order to maintain the structural limitations of the underlying SiO_xF_y layer during processing and to prevent out diffusion of fluorine from the SiO_xF_y which will change the values of refractive index, and material properties of the SiO_xF_y layer. As discussed above, EP teaches PECVD as the deposition technique of the SiO_2 layer, however It would have been obvious to a person having ordinary skill in the art to utilize any known deposition method to deposit the metal oxide layer. Known deposition techniques taught by Machol, for metal oxide layers, were discussed above, and include IBAD with an ion gun, and sputtering a metal layer and then oxidizing the layer to obtain a metal oxide layer.

Regarding claims 26 and 27, Machol et al. teach utilizing an argon gas with the IBAD deposition (col. 8, lines 50-55).

Regarding claims 30 and 53, it is inherent, that the refractive index of the material at the given wavelength and time will be the same as instantly claimed, since the materials and thicknesses of the prior at and the instant application overlap.

Regarding claims 40-43 and 61-64, the prior art of record does not teach the specific combination of hi and low reflective layers, however, It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to utilize any amount of layers since Machol teaches up to 12 alternating layers.

Depending upon the amount of reflectance desired it would have been obvious to vary the thicknesses of the subsequent layers based on the desired reflectance as is well known in the art. It would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the thicknesses of the layers for the desired reflectance, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 44-46 and 65-67, Machol et al teach that the antireflective coating is placed over a substrate. The substrate may comprise a laminated single version lenses each having a scratch resistant coating (Col. 8, lines 61-68). And in col. 3, lines 1-25, Machol et al. teach that the substrate may be an ophthalmic lens comprising an organic glass.

Response to Arguments

Applicant's arguments with respect to claims 22-67 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan C. Langman whose telephone number is 571-272-4811. The examiner can normally be reached on Mon-Fri 9:00 am - 4:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCL

Callie Shosho

Callie Shosho
Supervisory Patent Examiner